

Clues into the replication and transmission of influenza viruses in pigs

Kristien Van Reeth

*Laboratory of Virology, Faculty of Veterinary Medicine, Ghent University,
Belgium*

Influenza A viruses of H1N1, H3N2 and H1N2 subtype are enzootic in swine populations worldwide. Pigs are also considered pre-eminent intermediate hosts for the transmission of avian, potentially pandemic influenza viruses to humans. Still, the role of pigs in the genesis of the 3 pandemics of the 20th century, if any, remains unproven. While the pandemic H1N1 2009 influenza virus almost certainly comes from pigs, it is unclear why this novel H1N1 virus readily spreads from human-to-human, which contrasts with the established swine influenza viruses. Much of our ignorance about the role of pigs in pandemics relates to a lack of knowledge of the pathogenesis of influenza in pigs, and of the viral and host determinants of efficient replication and transmission in pigs as well as in humans.

In the first part of my lecture I will review comparative experimental studies of the pathogenesis and transmission of swine-adapted and avian influenza viruses in pigs. All of these studies point towards a strong barrier for infection of pigs with wholly avian viruses, and they suggest that these viruses have to adapt to pigs to establish a full replication potential and to transmit between pigs.

In the second part of my talk, I will review selected studies on the virological basis for influenza virus adaptation to pigs. I will also present recent findings about the distribution of avian- and human-type sialic acid receptors in the respiratory tract of pigs and humans and discuss their significance.